

Power Generation In York County

*Hydropower's Role In The
Electrical Generation*



Electrician 5 years (York Haven
Hydro St.)

O&M / GM 5 ½ years (York Haven
Hydro St.)

Mid-Atlantic Board Member 1
year

Turbine Topics 1 year

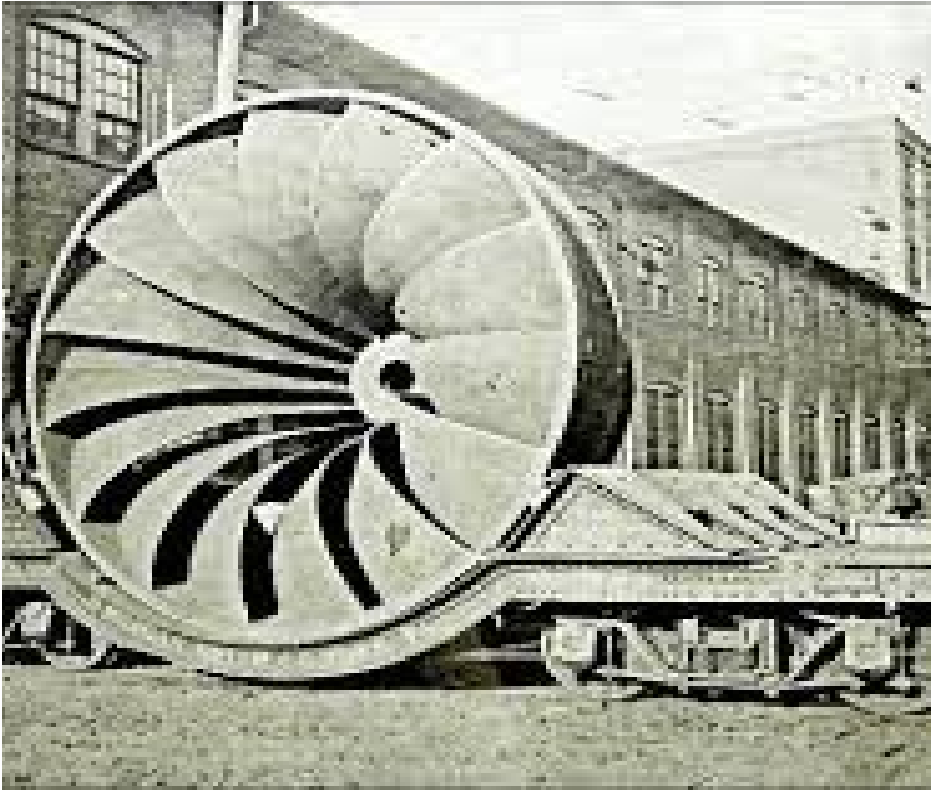
- LinkedIn Page
- Facebook page

formerly S. Morgan Smith book

page



Agenda



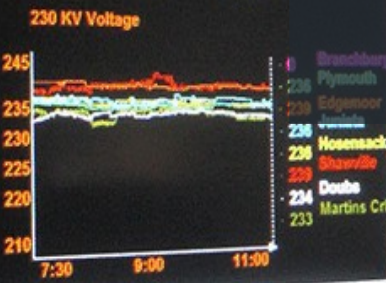
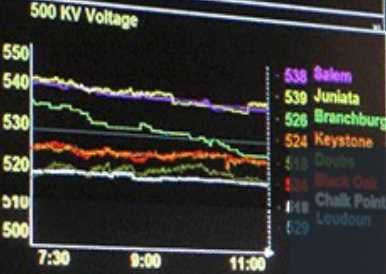
- o The electric grid, now and then
- o Entry of hydropower
- o Early turbine industry in York County
- o Early hydropower generation facilities



The Modern Grid

Primary Requirement	N/A	1994	418	1700
Primary Reserves	3542	1956	1586	1621
-Total Spinning	1912	1184	726	848
-Quick CTs	743	667	76	667
-Quick Hydro	893	109	784	109
Secondary Res.	12558	11946	612	6440
Operating Res.	16100	13902	2198	8061

PS / CONED Wheel Performance				
SCHEDULE	REDIRECT	ADJ. SCHED	ACTUAL	DELTA
JK 545	0	545	583	38
ABC -54	O.F. OFFSET 0	-54	-732	-122
CONED RTE = 700				



- 0 Amos
- 765 Baker
- 770 Cloverdale
- 759 Gavin
- 781 Rockport
- 767 Cook
- 769 Joshua
- 770 Axton

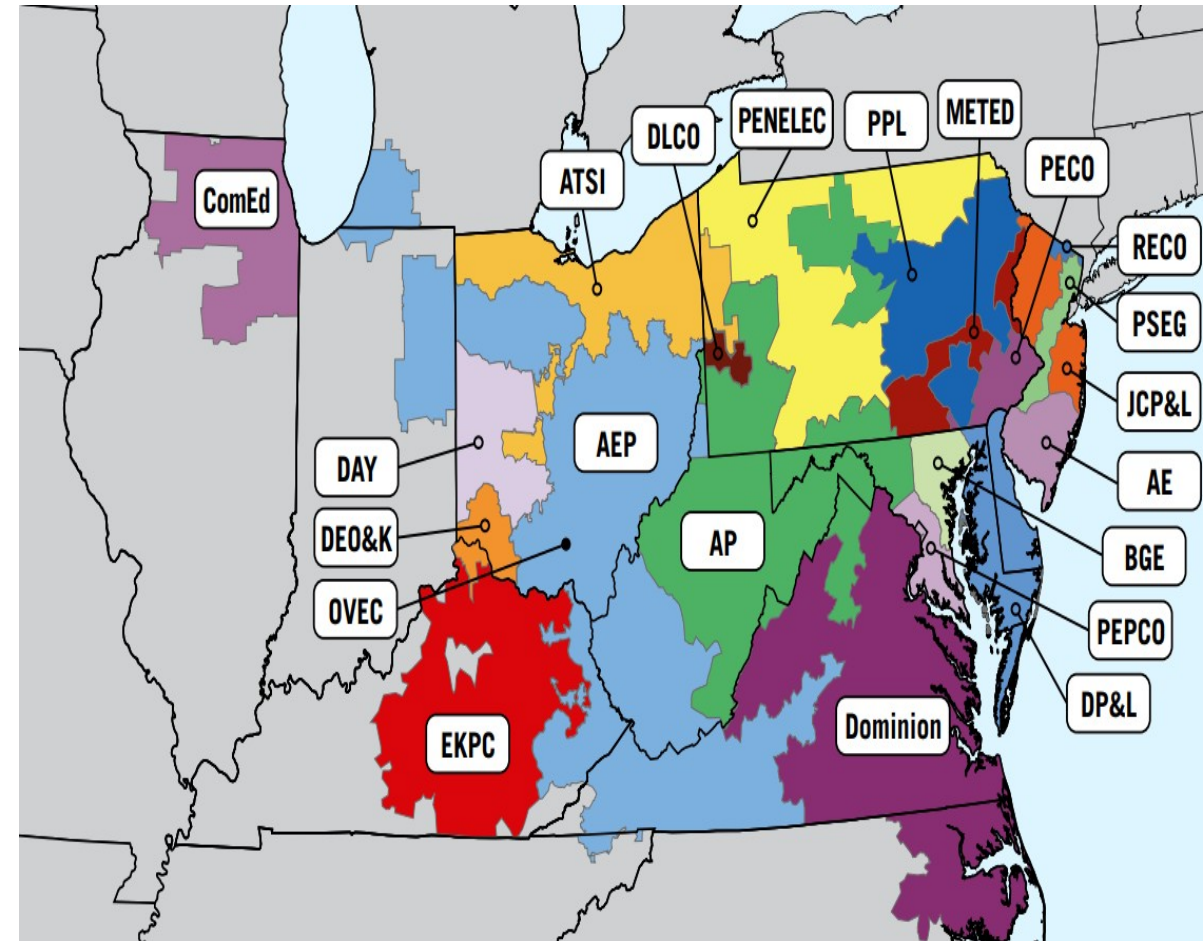
- 0 Amos
- 350 Baker
- 343 Canton
- 0 Cook
- 0 Tanners Ck
- 340 Dresden
- 353 Lombard
- 350 Kendall

- 538 Salem
- 539 Juniata
- 526 Branchburg
- 524 Keystone
- 518 Double
- 534 Black Oak
- 518 Chalk Point
- 529 Loudoun

- 0 Branchburg
- 238 Plymouth
- 236 Edgemoor
- 236 Juniata
- 236 Hosenbach
- 239 Shawville
- 234 Double
- 233 Martins Ck

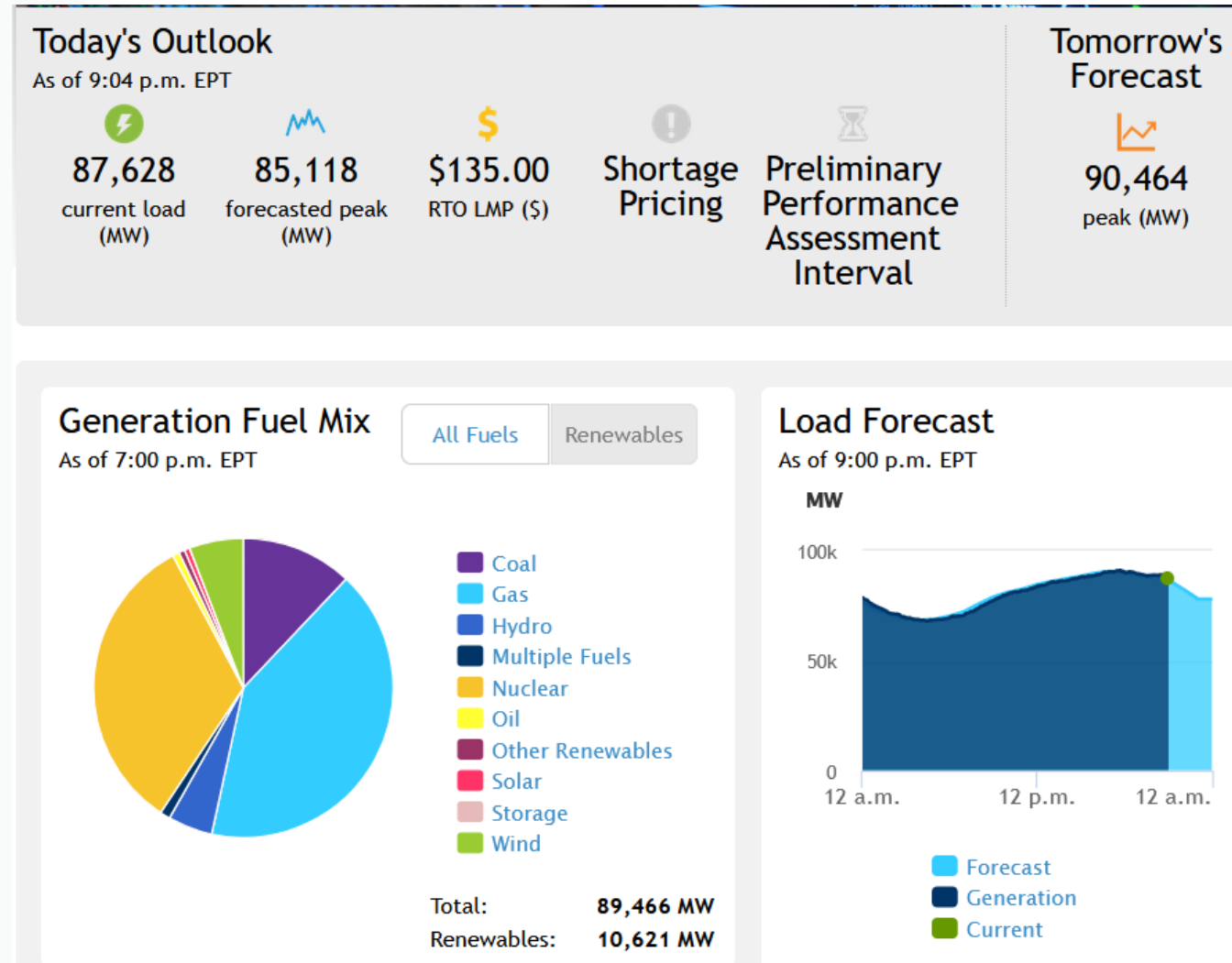
The PJM Network

- Comprised of multiple territories of “nodes”
- Regulates power flowing in and out of the network and various nodes
- Maintains reliability and quality of the grid
- Controls power price rates, thus incentivizing additional generation to come online or go offline



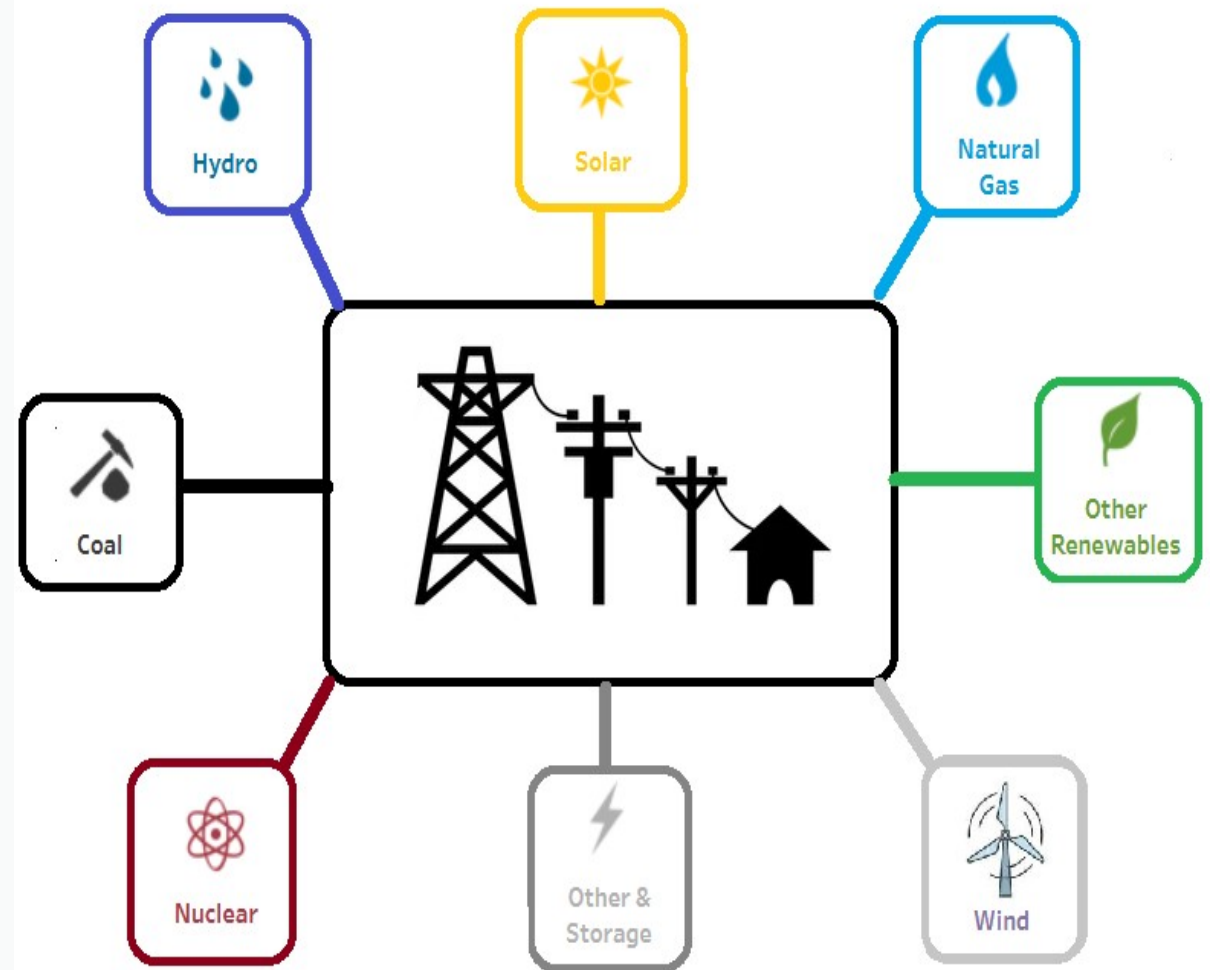
The PJM Network

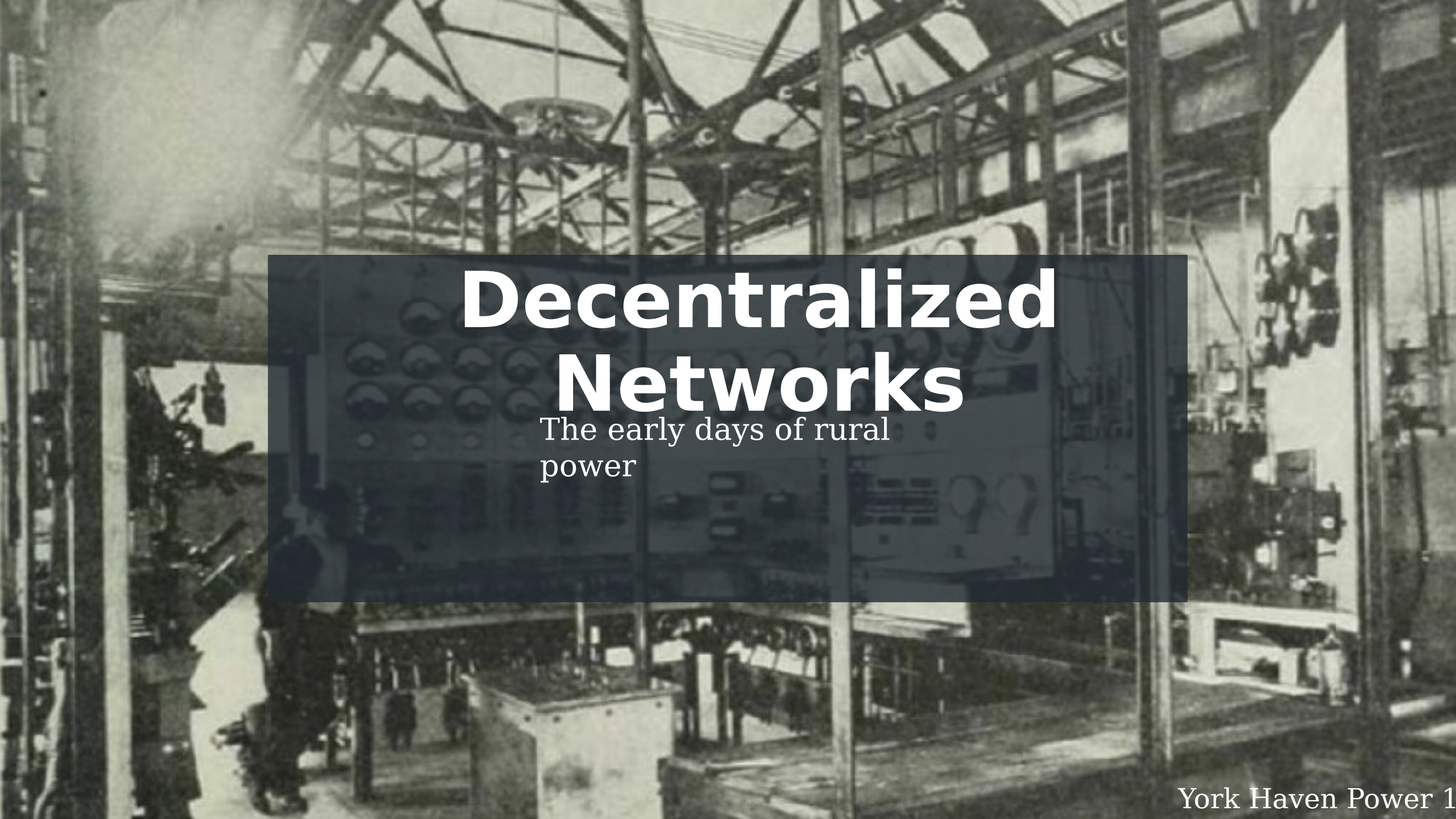
- Future-proof the grid by controlling and running simulations on new generation and old generation being retired from the grid.
- Plans contingencies for grid failure.
- Forecasts power generation and demand



The PJM Network

- Connects a variety of generation facilities with different fuel sources
- Variety provides stability and reliability
- Balance provides smoother pricing fluctuations





Decentralized Networks

The early days of rural
power

Independent Power

- Individual industrial users generated power onsite (*mech. and or elec.*)
- Individual agricultural facilities still mostly operated strictly on mechanical power
- Distribution was often limited to the property on which it was generated.
- Only as reliable as your maintenance



Schmidt & Alt Papermill (1)
turbine

Independent Power

Known Waterpower Users In York County

Manufacturing

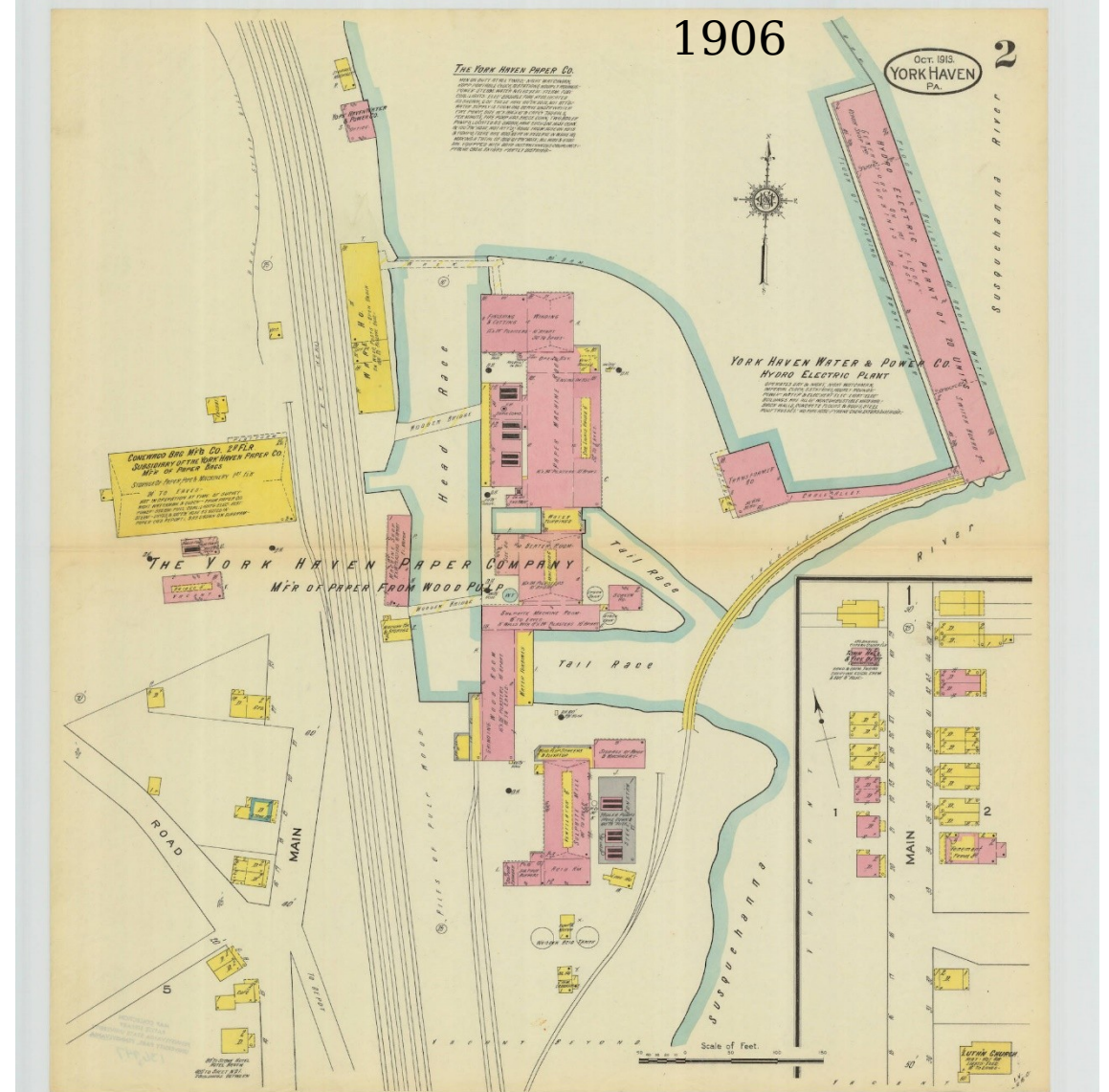
Schmidt & Alt Paper Mill

York Haven Paper Mill

Conewago Bag Co. (YH paper property)

Felt Company (YH paper property)

Various flour/grist mills

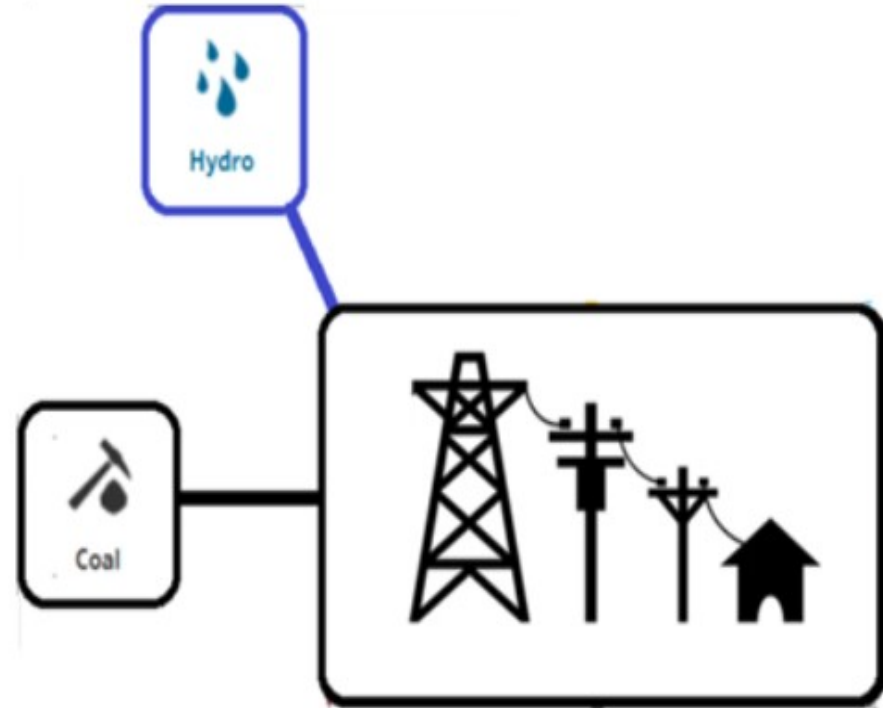


York Haven Paper Co.
Hydro

York Haven

Early Distribution

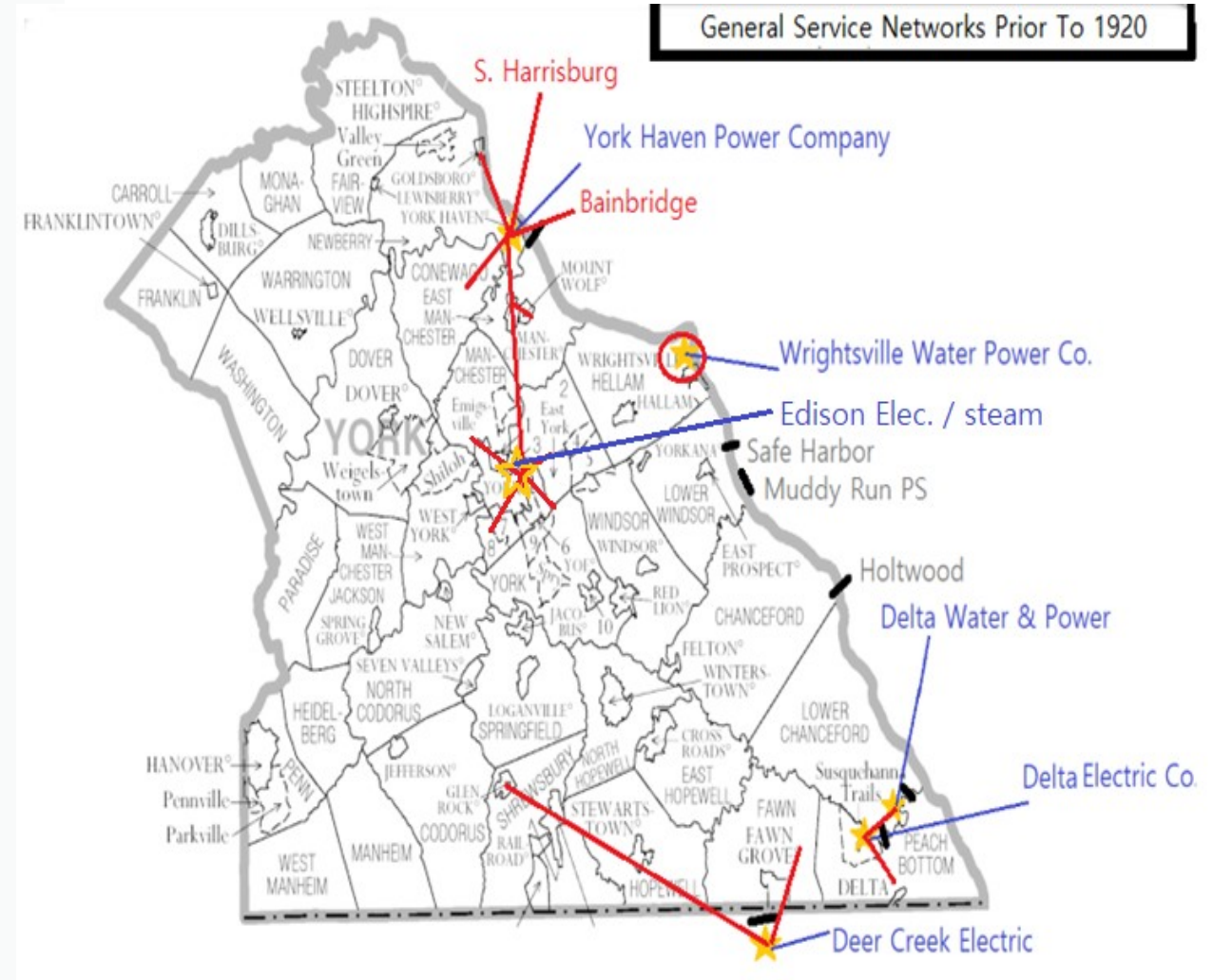
- Unreliable and intermittent
- Limit grid diversity
- Non-interconnected small networks
- Unregulated
- Often, industries had gas/coal/steam backups



Early Distribution

Power Networks around 1920 (hydro only)

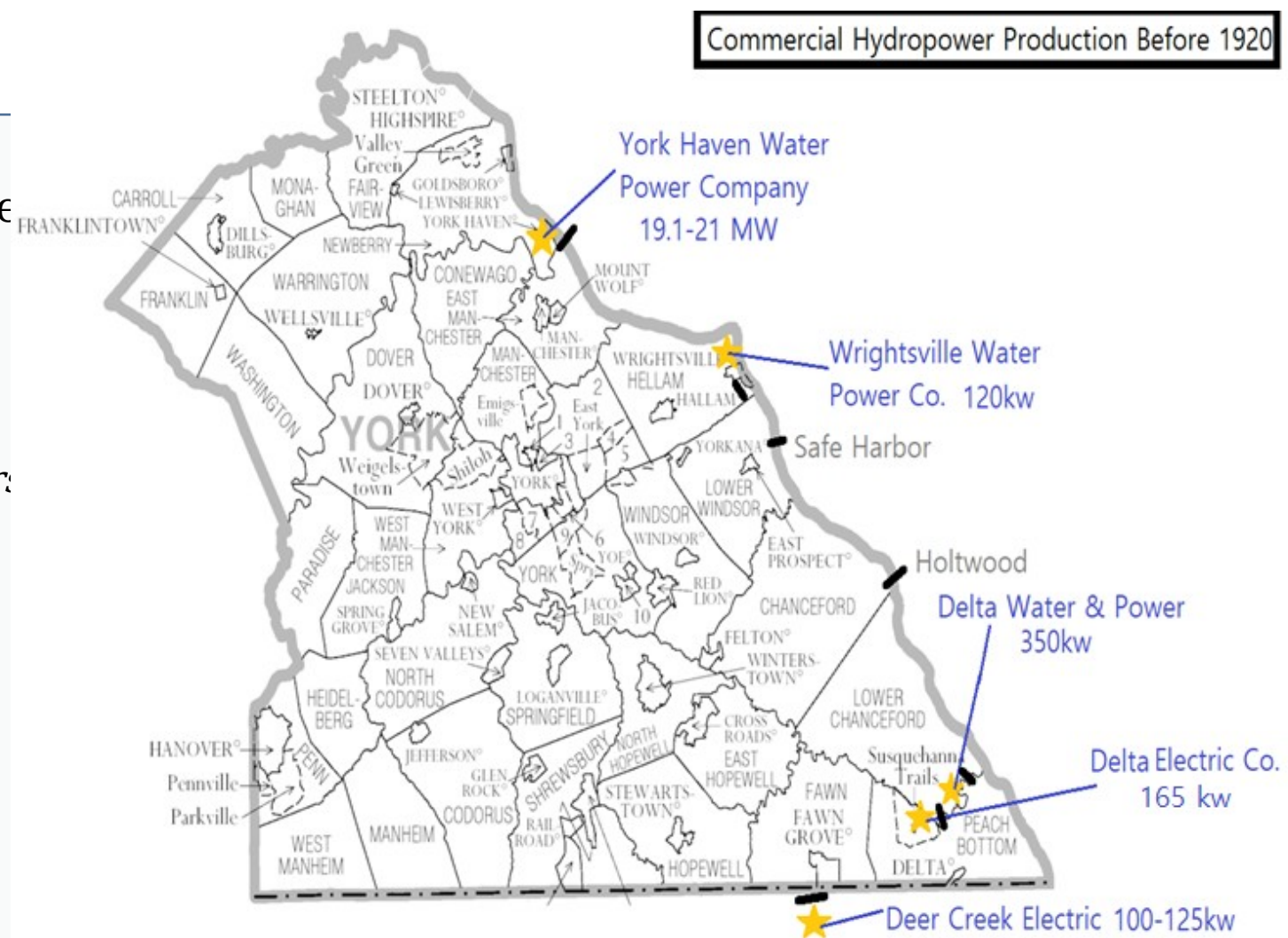
- No backup capability
- Susceptible to storm damage
- No interconnected
(Delta facilities did eventually get interconnected to each other, but not initially)



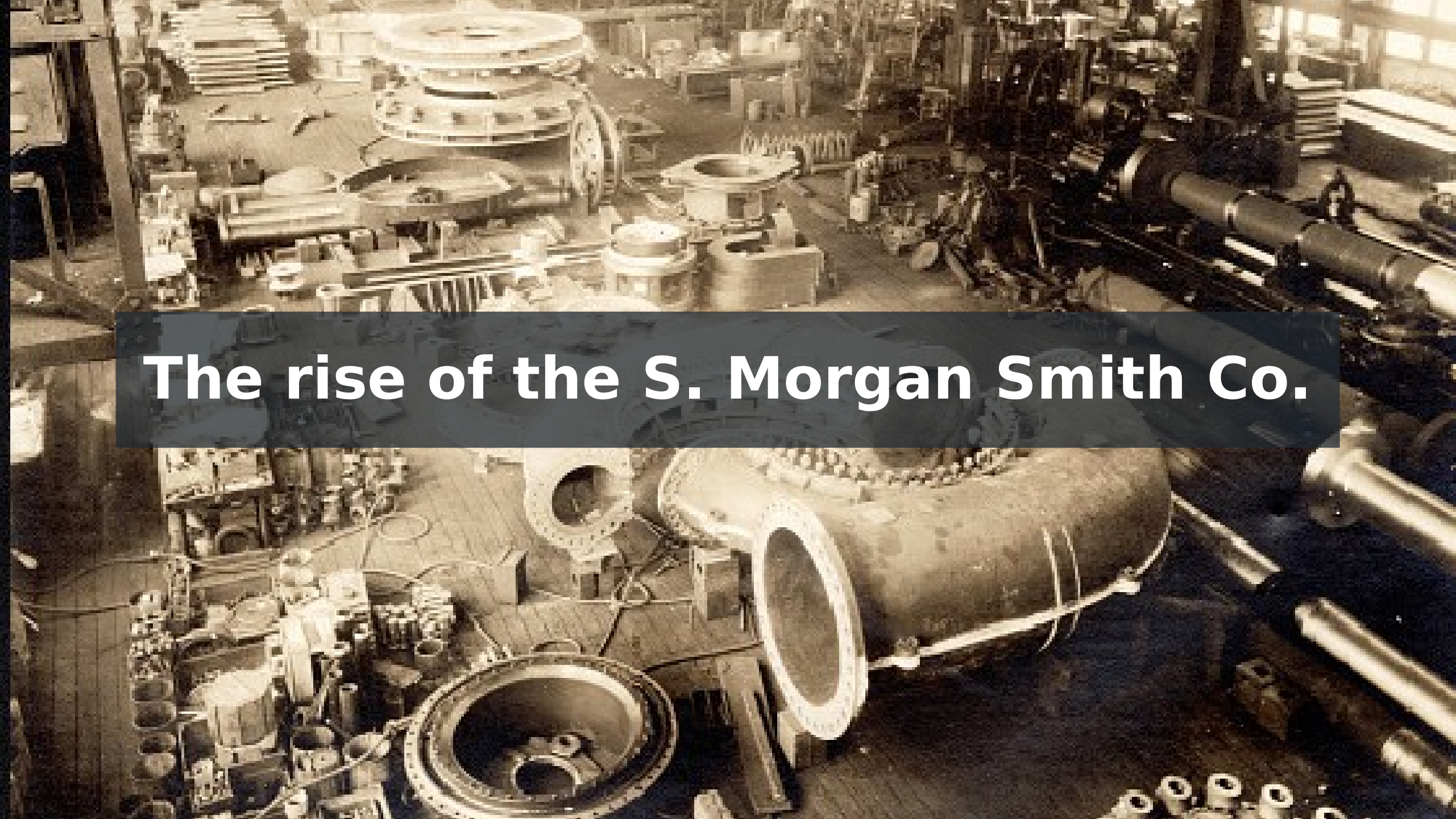
Early

Steam heat and electric heat were available in York City. But hydro power leads in the countryside.

- York Haven Power
 - 22 units (*counting the exciter*)
- Wrightsville P & L
 - 2 units
- Delta Water & Power
 - 2 units
- Delta Electric Co.
 - 1 unit
- Deer Creek Electric
 - 2 units



Projects were started at the Wrightsville/Columbia dam and a 3rd dam at "the gorge" on Muddy Creek. Both were canceled due to financial issues.



The rise of the S. Morgan Smith Co.

Hydro Manufacturing Prowess in York County

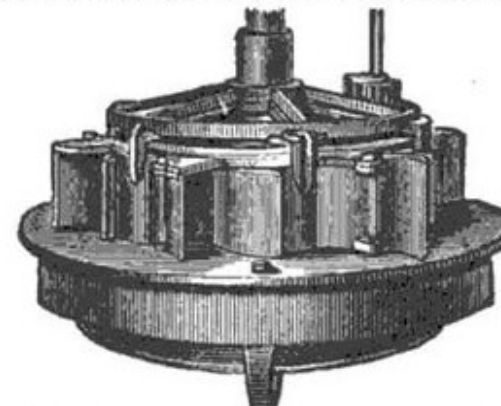
The turbine market in the 1800s was fiercely competitive

- Multiple manufacturers were fighting for market share
- Multiple designs of gates and configurations
- 6 known manufacturers were present in some capacity in York County alone.
(possibly more)

Fitz Water Wheel Co. of Hanover is omitted. Fitz contracted production rights from Burnhams'



The Economical Turbine.
24-inch wheel, sent by S. Martin, York, Pa.

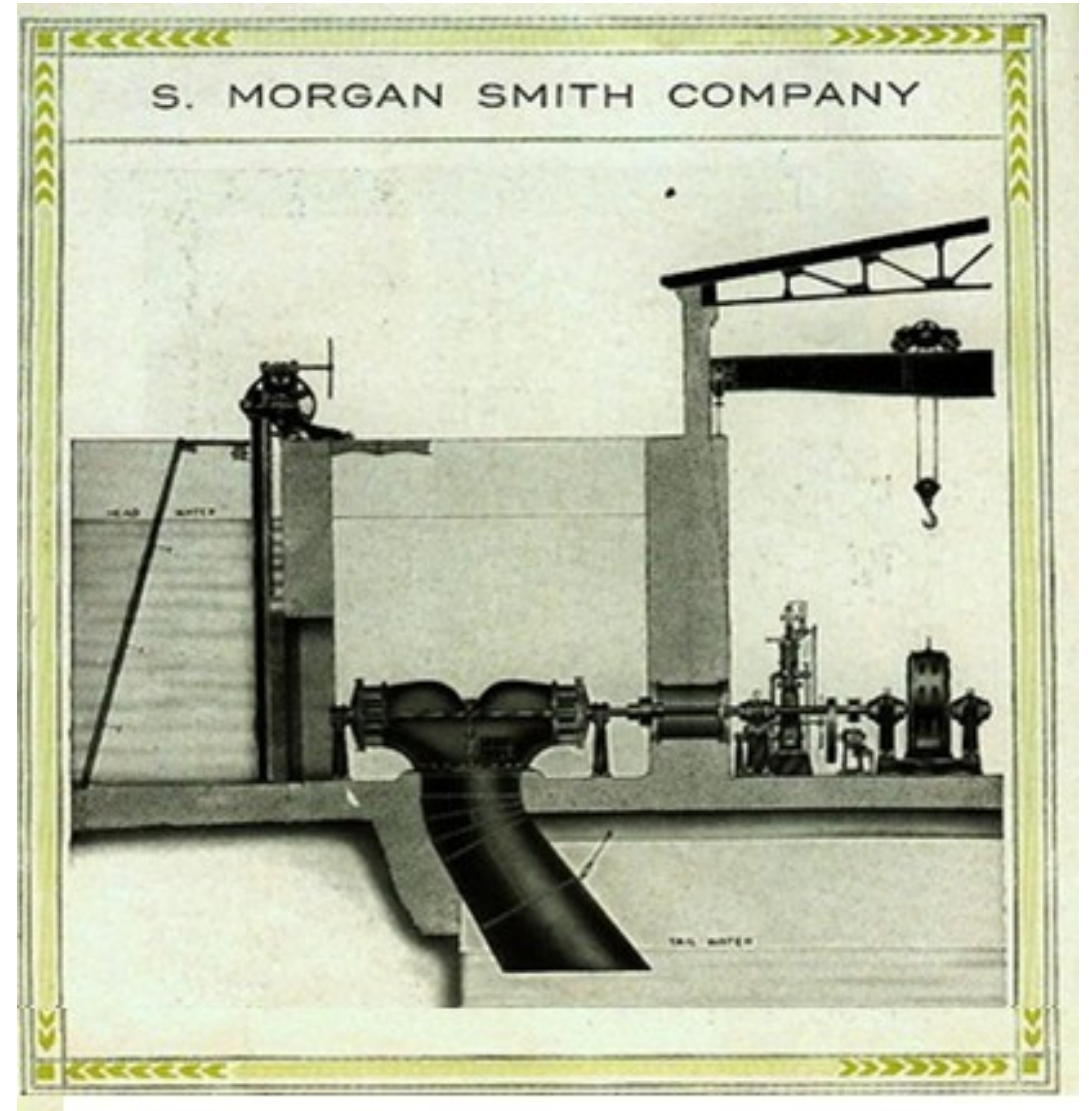


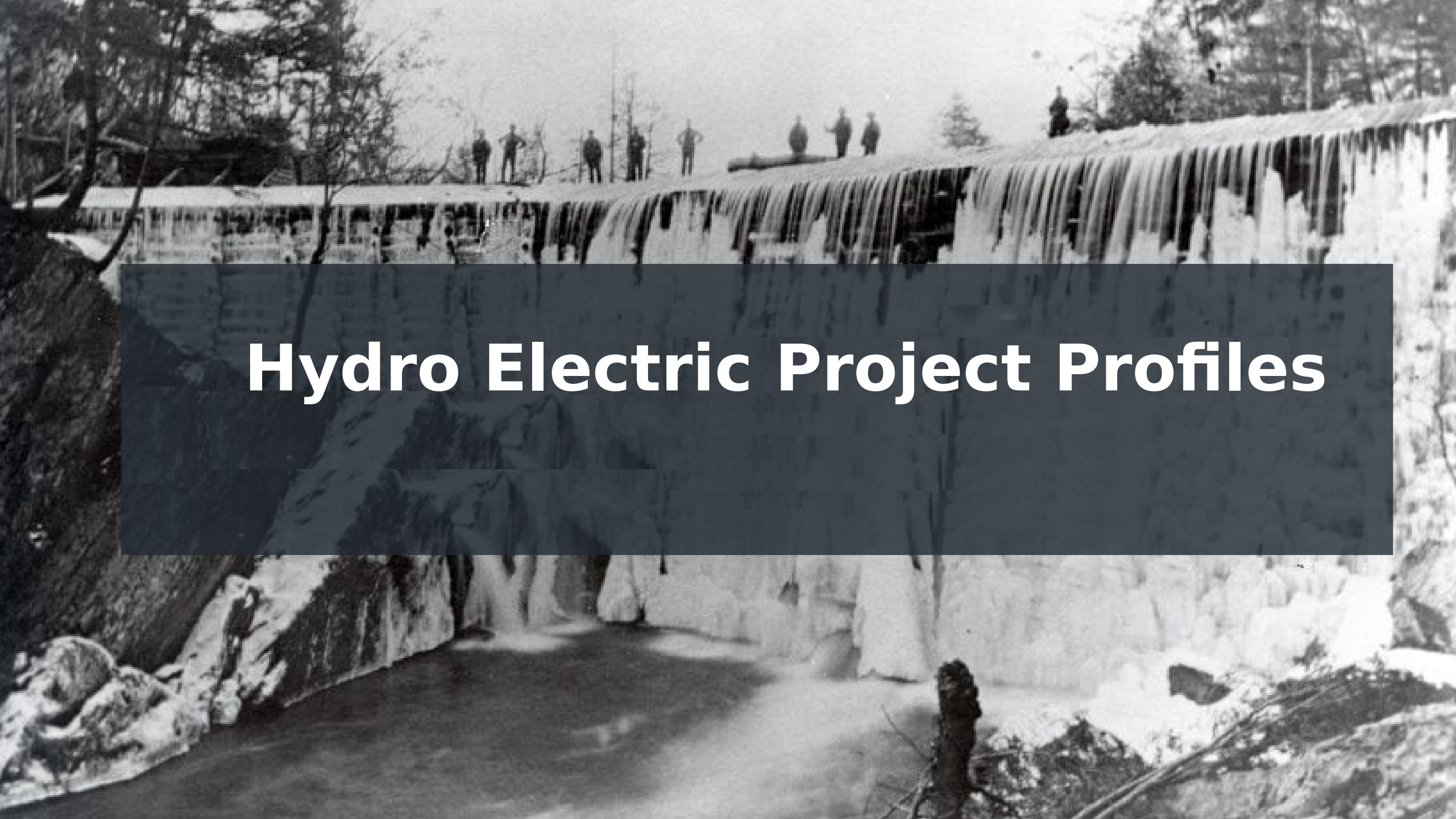
Hydro Manufacturing Prowess in York County

Technical limitations were detrimental for most.

- Manufacturers succumb to competition.
- Diminishing customer base in the milling industry due to electrification & electric motors
- Difficulty with forging larger castings.
- Failures to re-invent and adapt to larger and different designs to support power generation.

Smith's foresight gave him a big advantage as electrical generation became the future.





Hydro Electric Project Profiles

Wrightsville Power & Light ~ Wrightsville, PA

Operating Name: Wrightsville Power & Light

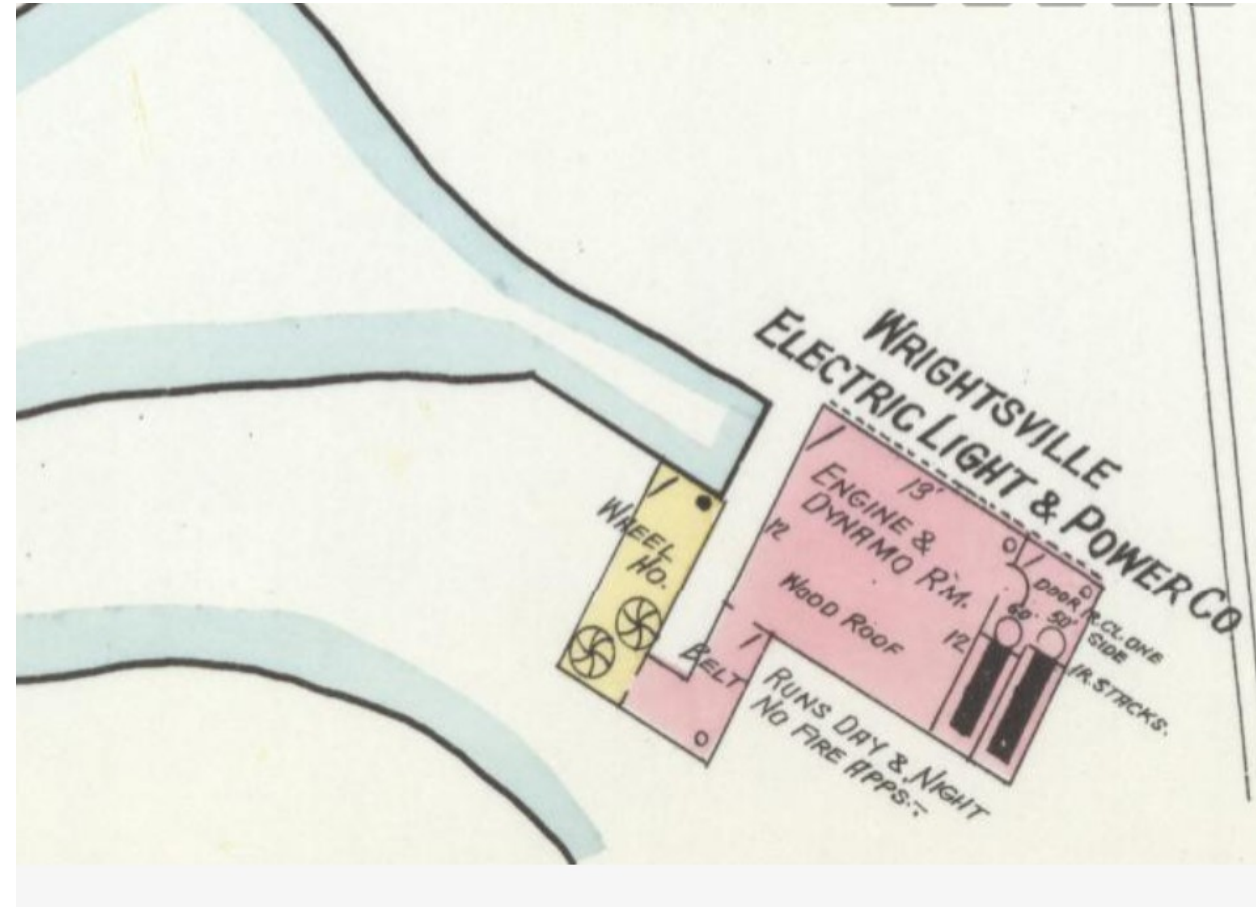
Incorporated: January 15th, 1902

Operational Span: 1904 to 1934

Service Area: Borough of Wrightsville & East Prospect

General Purpose: Mill converted to electric generation

***Interesting Fact:** S. Morgan Smith, via the local sheriff, temporarily seized the property for non-payment of provided equipment during construction.*



Wrightsville Power &

Supplying Tributary: Kreutz Creek

Operating Head: 17'

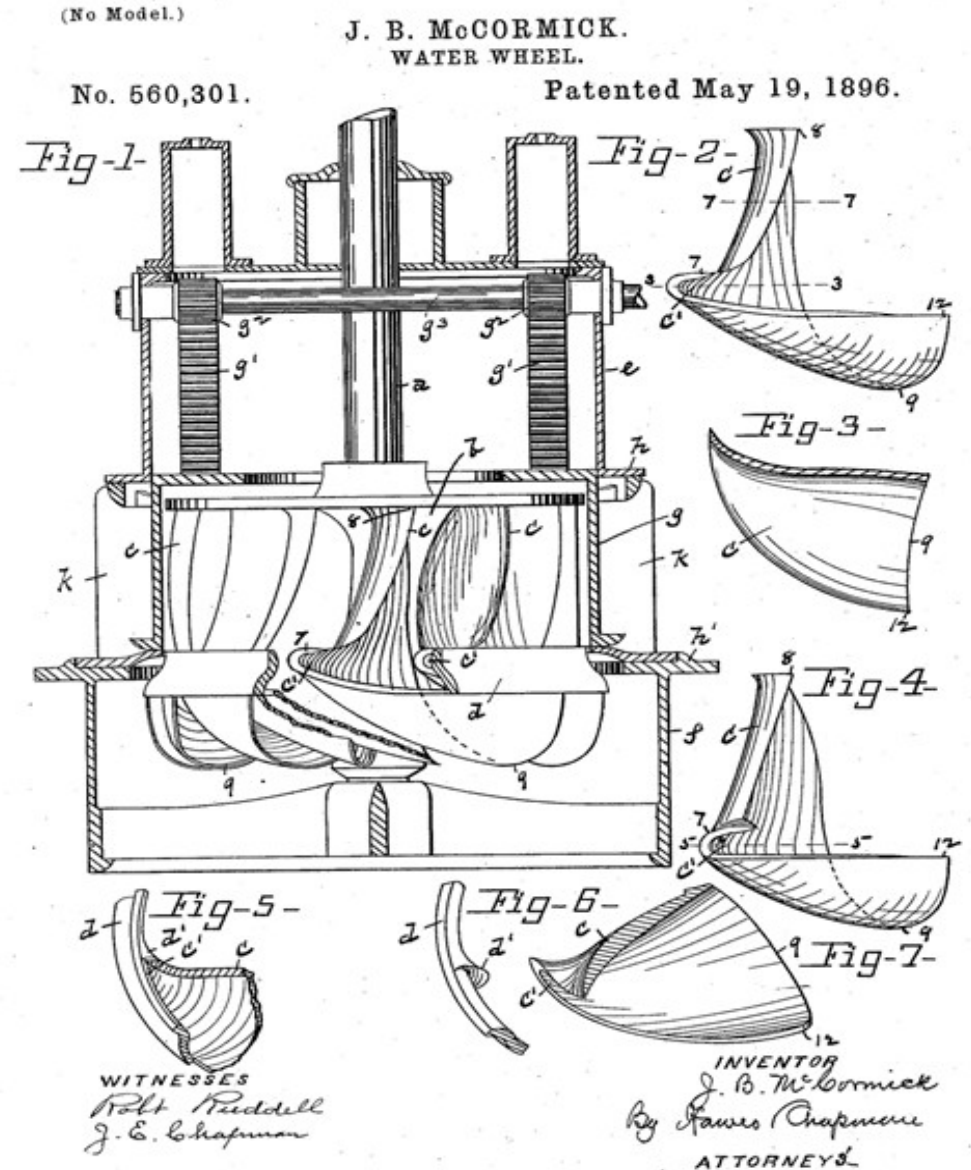
Unit Count: 2

Turbine Manuf.: 24" S. Morgan Smith- McCormick turbines

Generator Manuf: Unknown (*likely Westinghouse*)

HP Created: 120

Power Generated: 120 kW



Wrightsville Power & Light

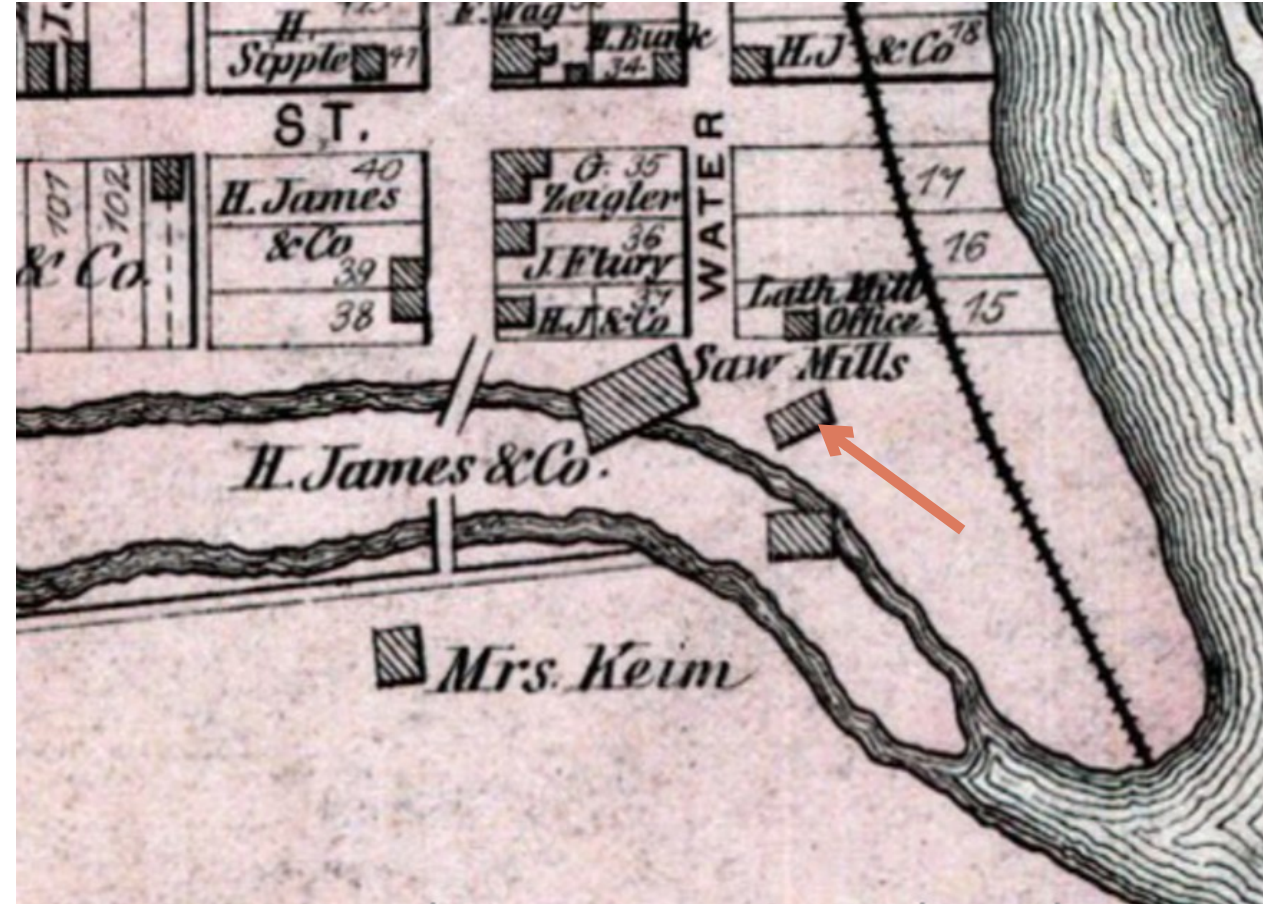
Closure:

1915: Plans were approved to receive power from York Edison Electric

1925: Facility purchased by Edison Electric

1934: Facility listed as “idle”

2025: The Building is still present as a woodworking shop



Delta Water Power Co.

Operating Name: Delta Water Power Co.

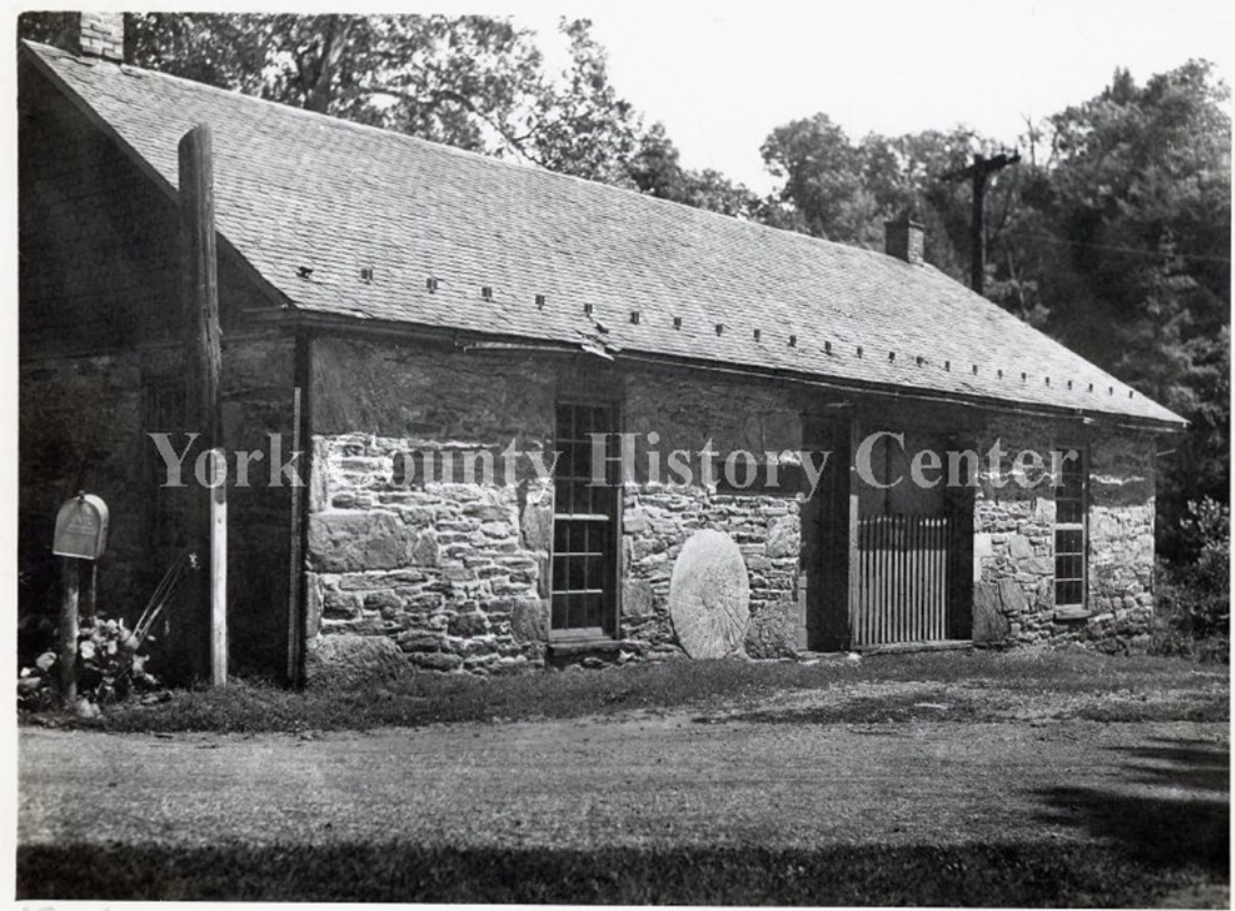
Incorporated: October 1906

Operational Span: 1907?- 1936?

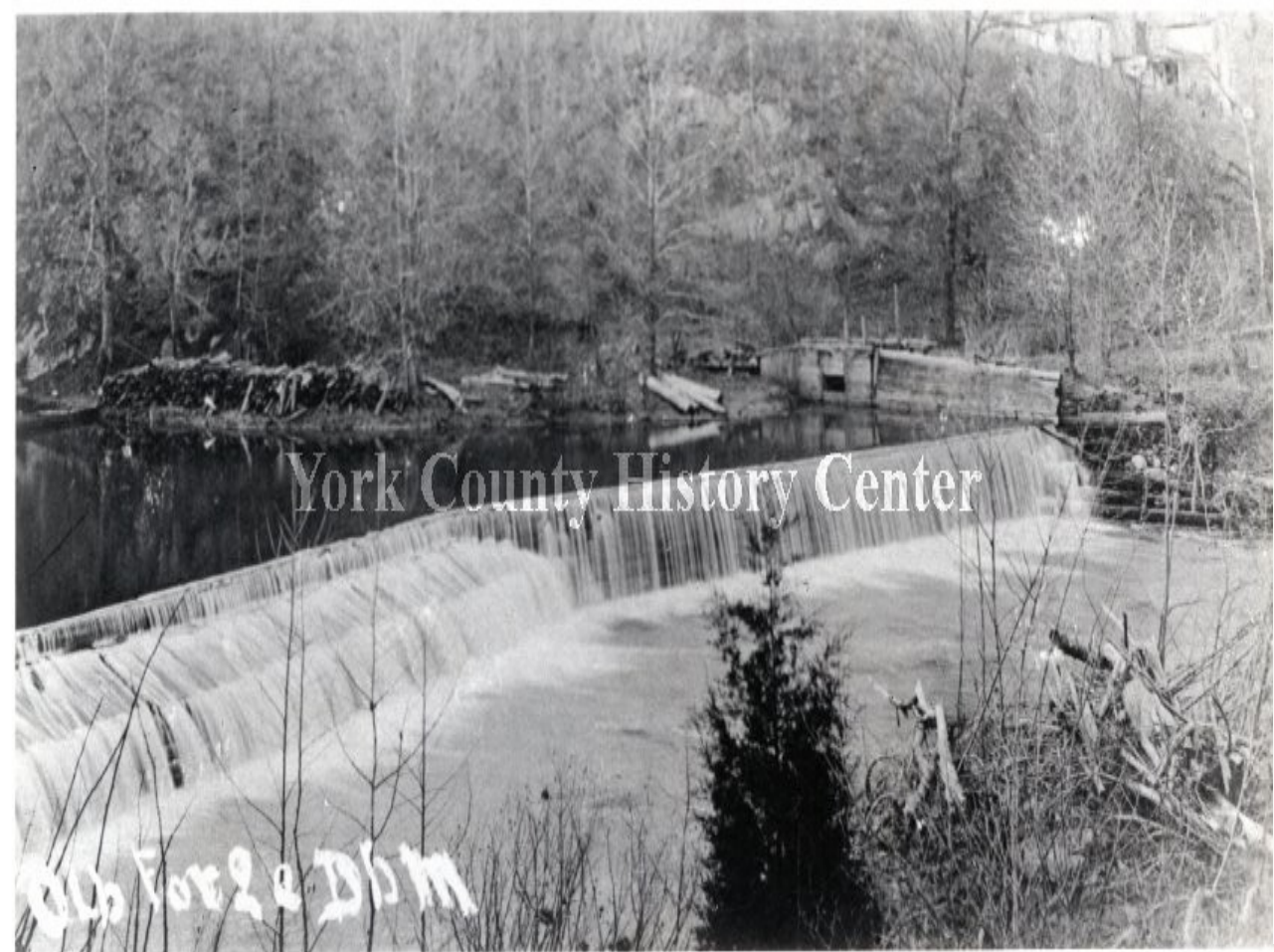
Service Area: Delta vicinity

General Purpose: Lighting, residential power, and power for quarries

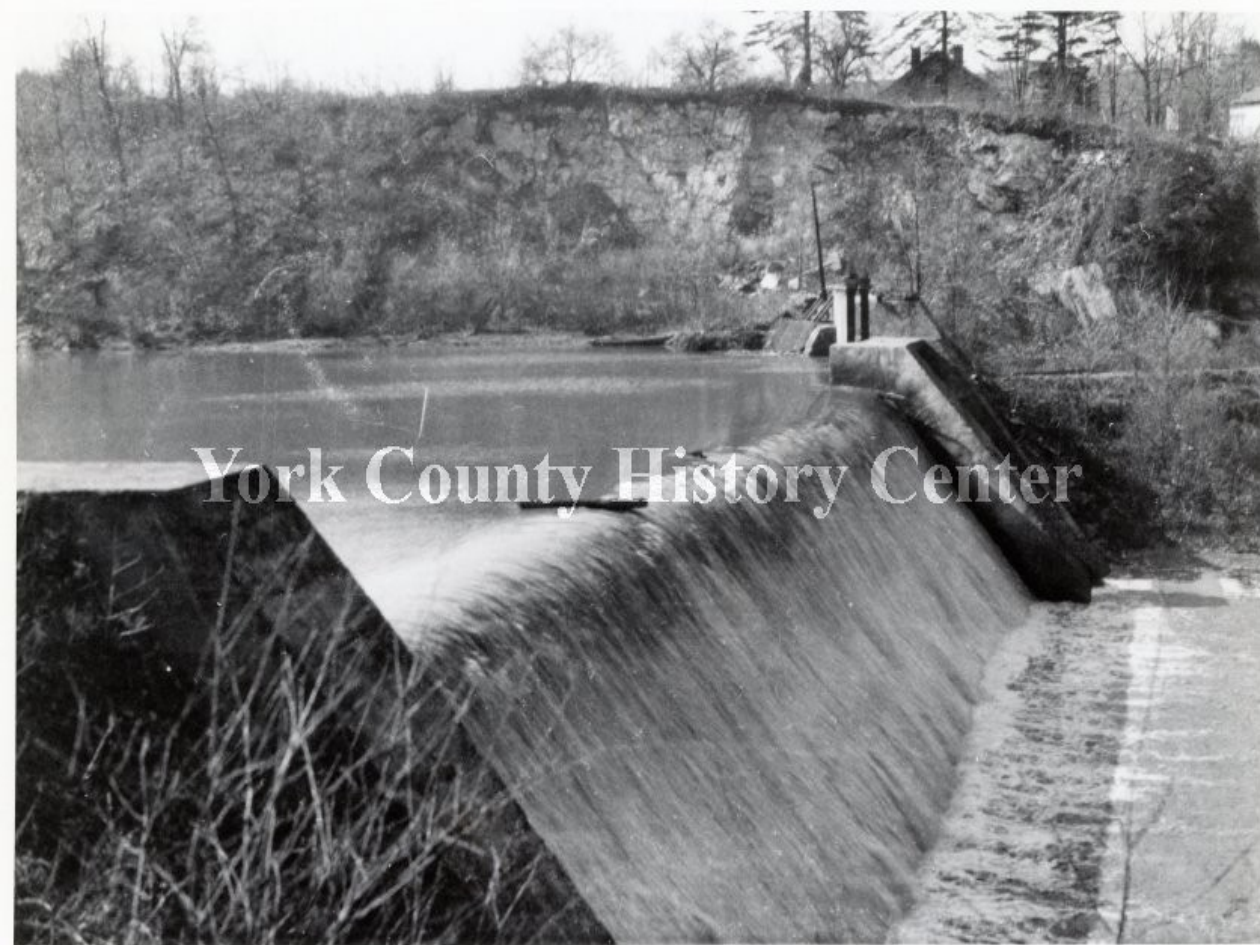
***Interesting Fact:** The property began life as a flour mill. Noted as making 3 barrels an hour*



Delta Water Power Co.



Lower Original Timber crib mill
dam 8-10'



Upper Concrete Dam 21' +/-
*(Remnants demolished in
1995)*

Delta Water Power Co.

Supplying Tributary: Muddy Creek

Operating Head: 21'

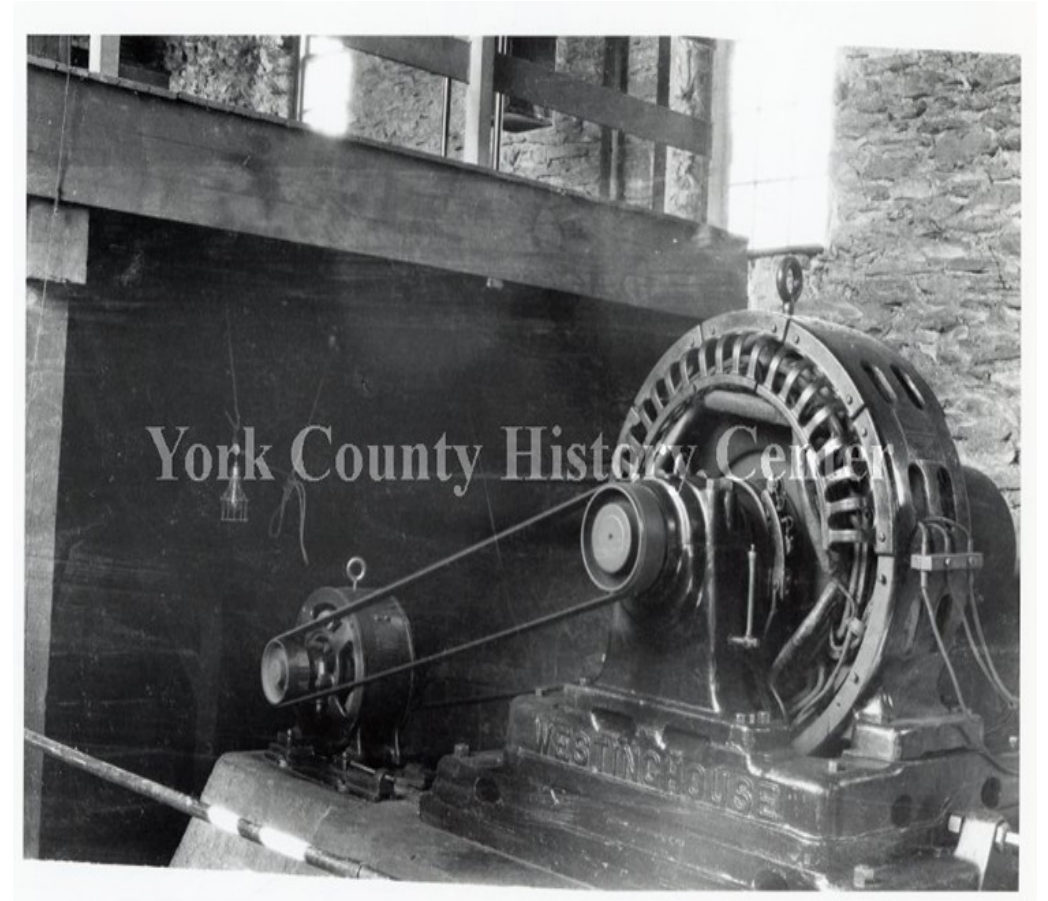
Unit Count: 2

Turbine Manuf.: S. Morgan Smith – McCormick 24"

Generator Manuf: Westinghouse

HP Created: 500

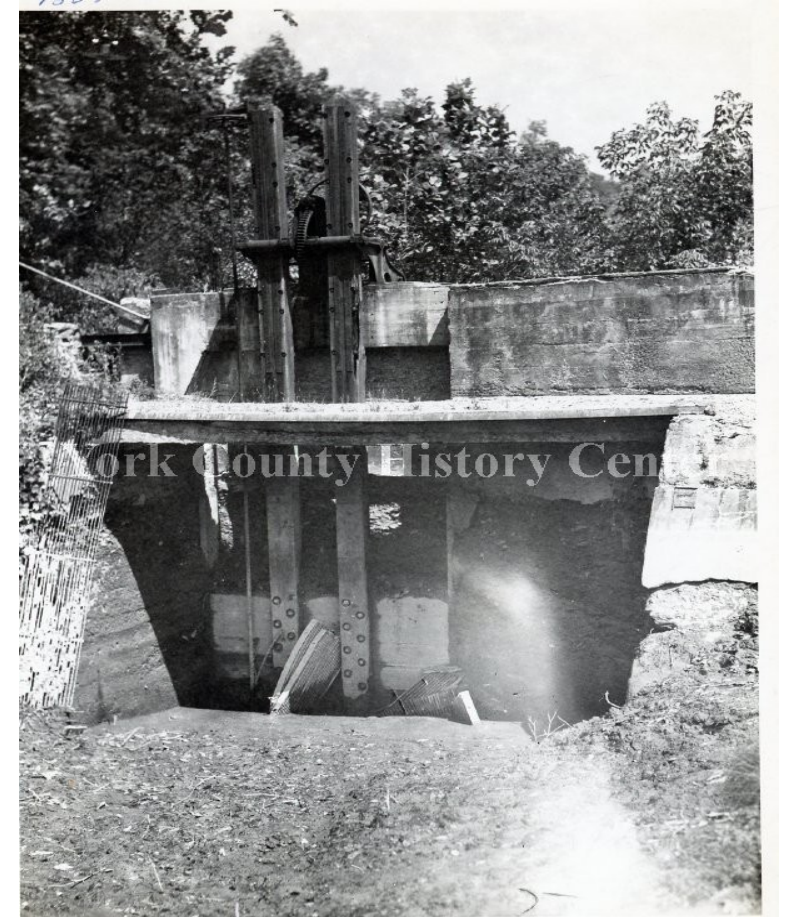
Power Generated: 165 kW



Delta Water Power Co.

Closure:

- Unable to identify a specific date, but all documentation stops after 1934
- Demolished 1948
- Likely reasons for closure:
 - Holtwood Dam
 - Economics



Delta Electric Power Co. Delta, PA

Operating Name: Referred to as “Gartridge Falls Powerplant” in documents.

Incorporated: 1896

Operational Span: 1896 – 1934?

Service Area: Delta area and parts of Cardiff, MD.

General Purpose: Electric power
Interesting Fact: First commercial purpose-built hydro power plant in York County



Delta Electric Power Co.

Supplying Tributary: Muddy Creek

Operating Head: 41'

Unit Count: 1

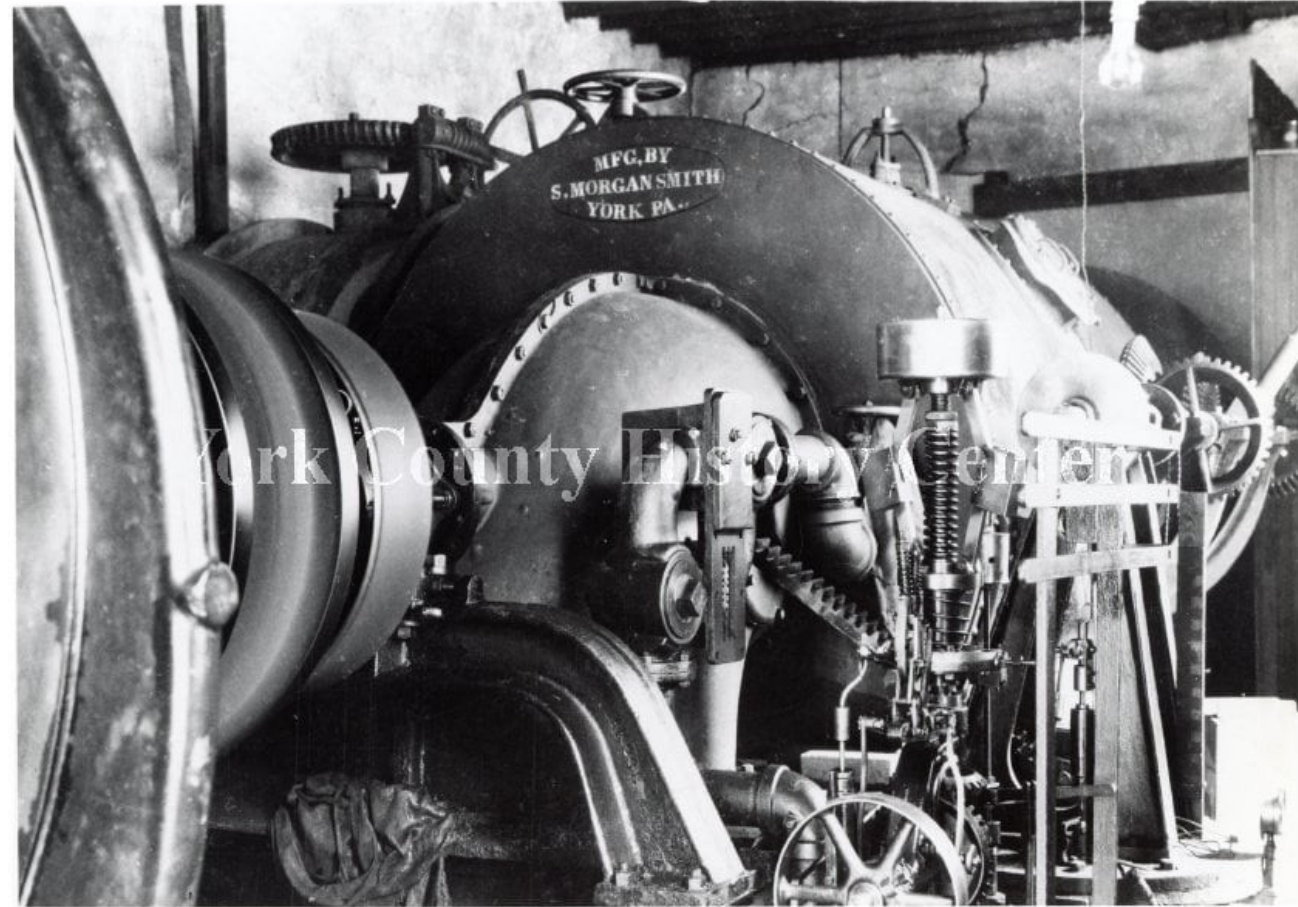
Turbine Manuf.: S. Morgan Smith

Double Francis turbine unit

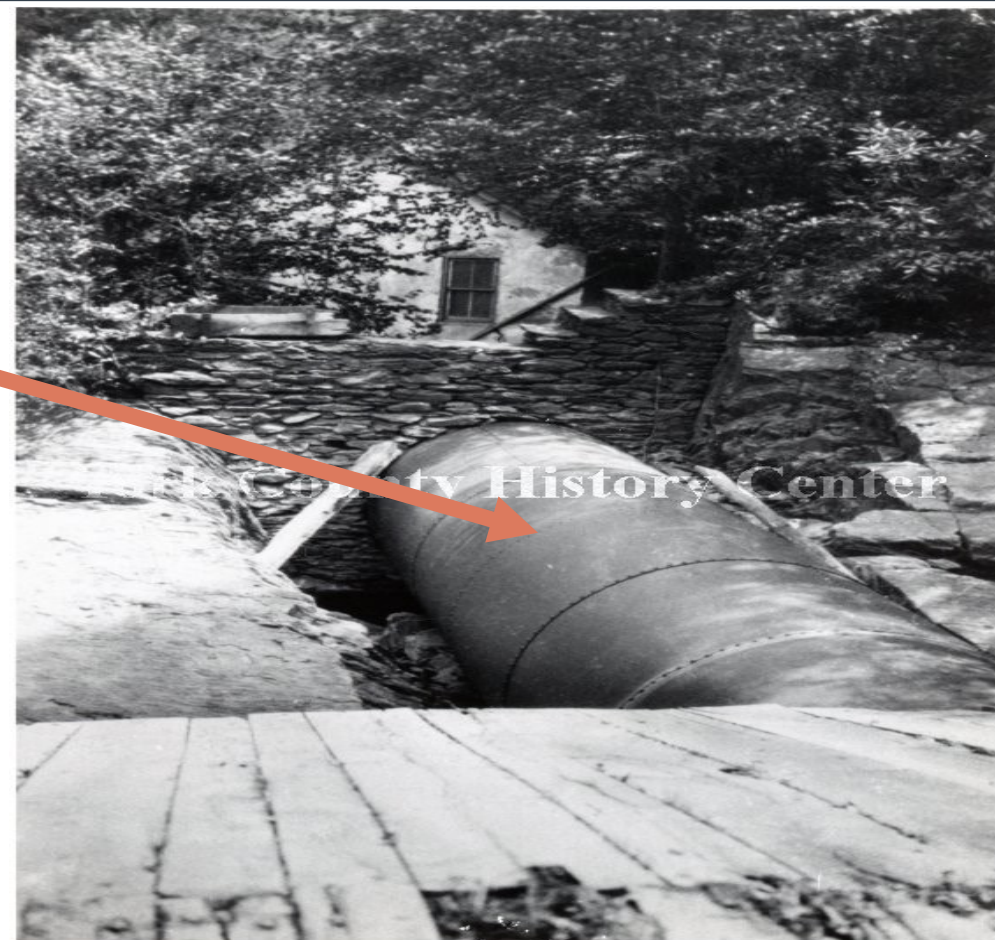
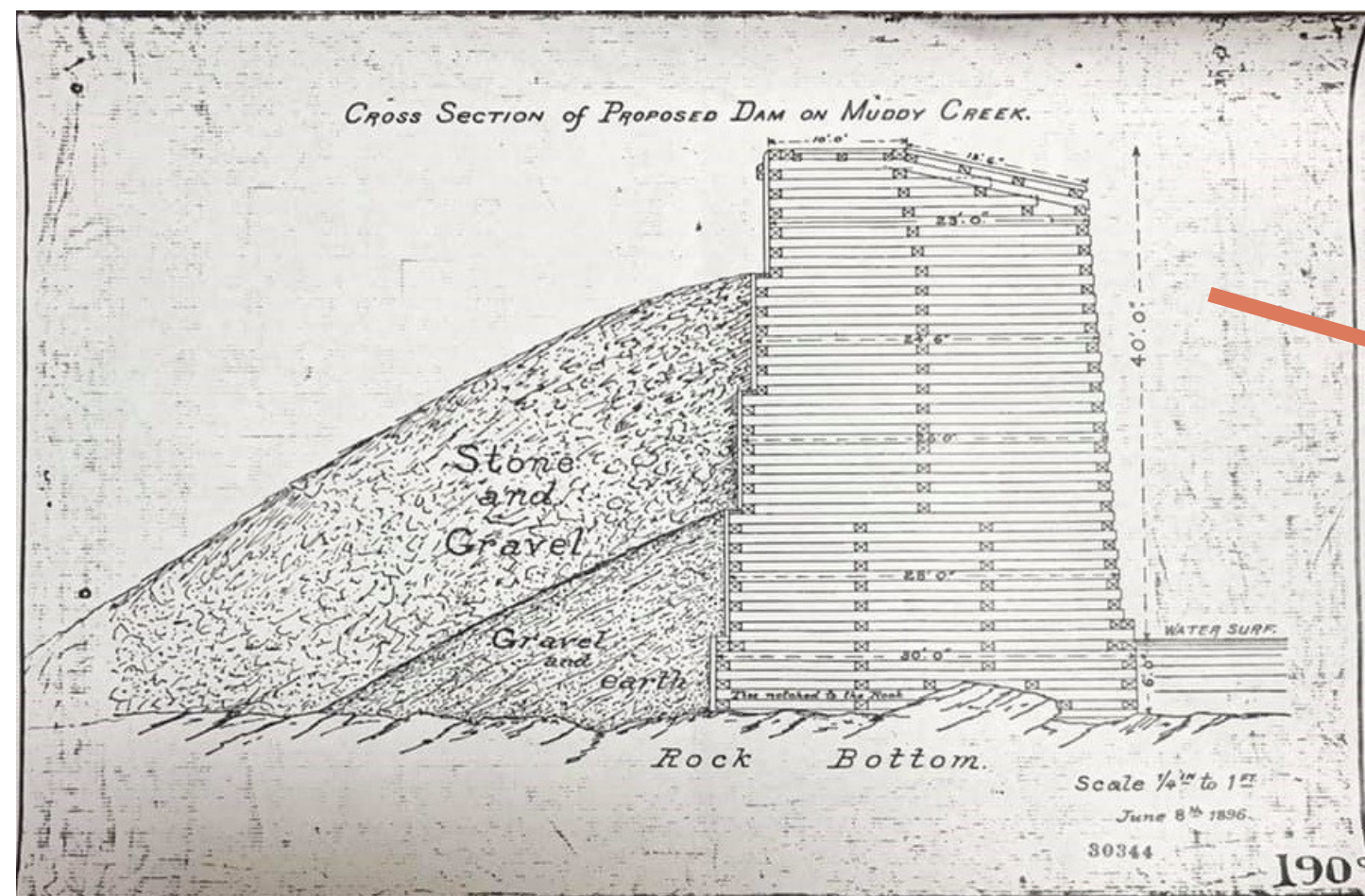
Generator Manuf: SKF

HP Created: estimated 675 hp

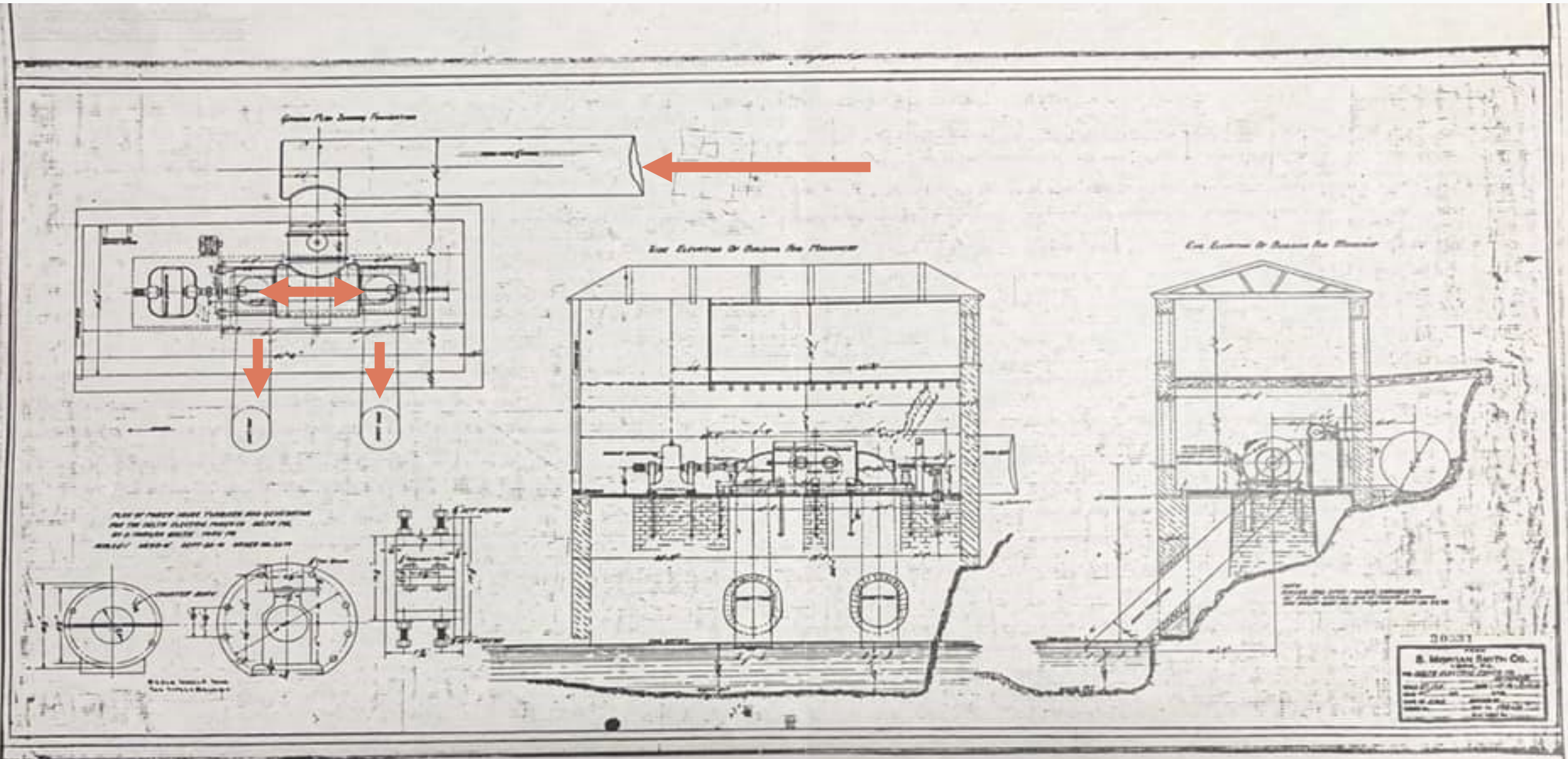
Power Generated: 375 kW 2-phase



Delta Electric Power Co.



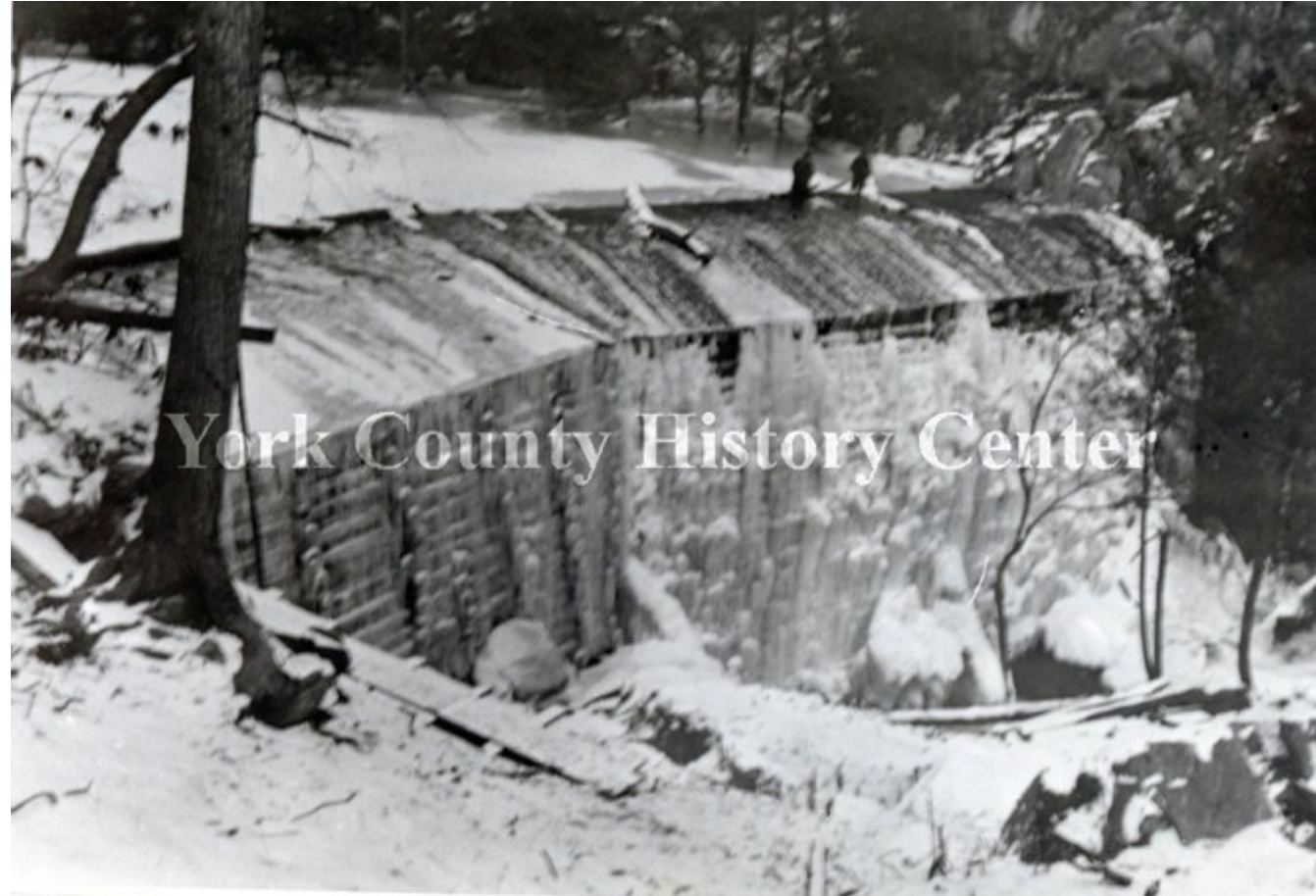
Delta Electric Power Co.



Delta Electric Power Co.

Closure:

- Poor economics due to the more reliable Holtwood dam
- Lack of debris racking caused constant issues
- Subject to flood damage
- Poor excavation in the discharge pool caused efficiency losses



York Haven Power Co.~ York Haven, PA

Operating Name: York Haven Power Co.

Incorporated: 1901

Operational Span: 1904 – Present

Service Area:

- o Then: York, Dolphin, Lancaster County
- o Now: PJM

General Purpose: Electric generation

Interesting Fact: Though sharing a headrace and being owned initially by the paper mill, the power plant was taken to court multiple times over water rights and usage by the mill



York Haven Power Co.

Supplying Tributary: Susquehanna River

Operating Head: 23'

Unit Count: 20 (excluding 2 exciter units)

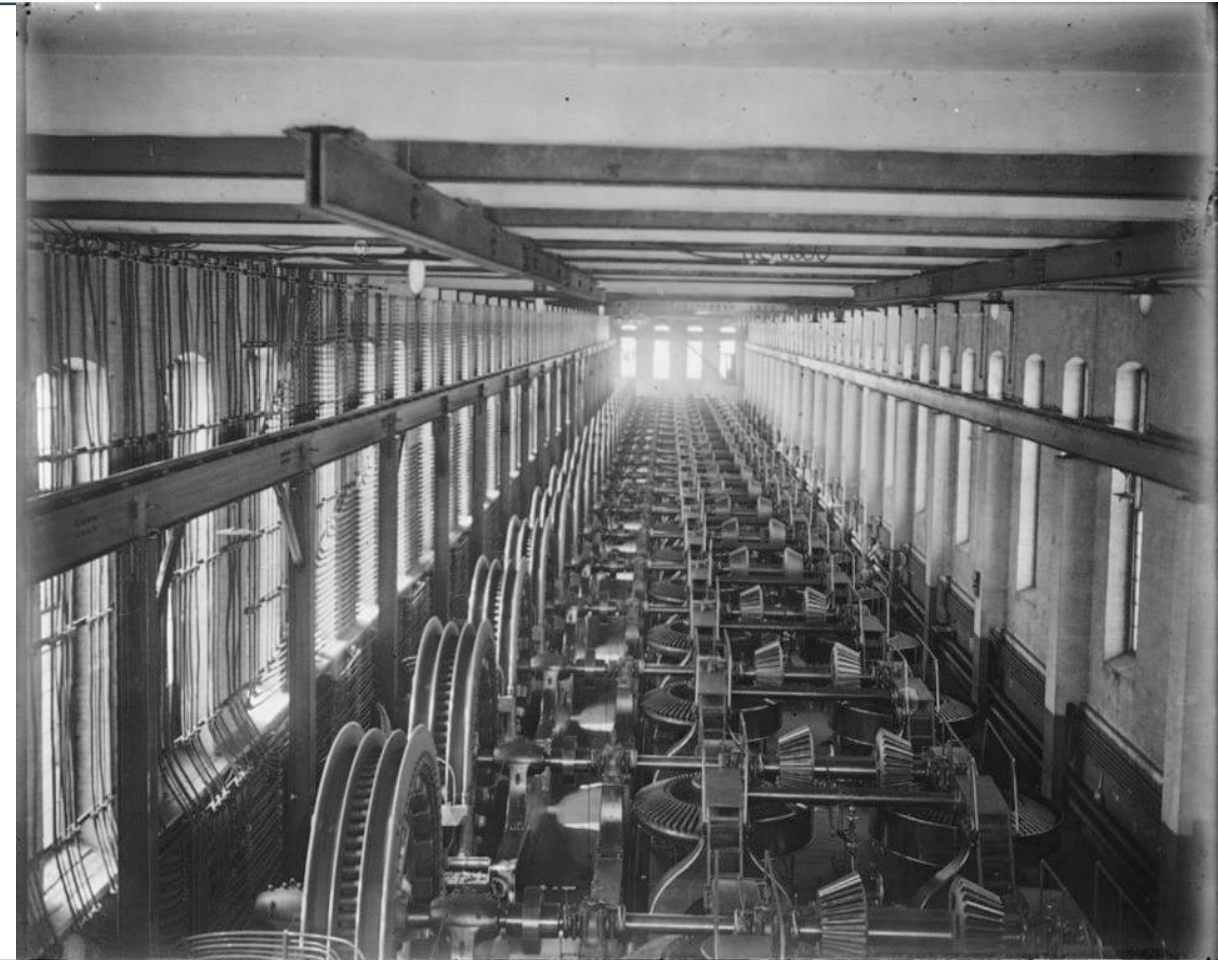
Turbine Manuf.: Poole engineering (*as installed*),

S. Morgan Smith, American Hydro
(current)

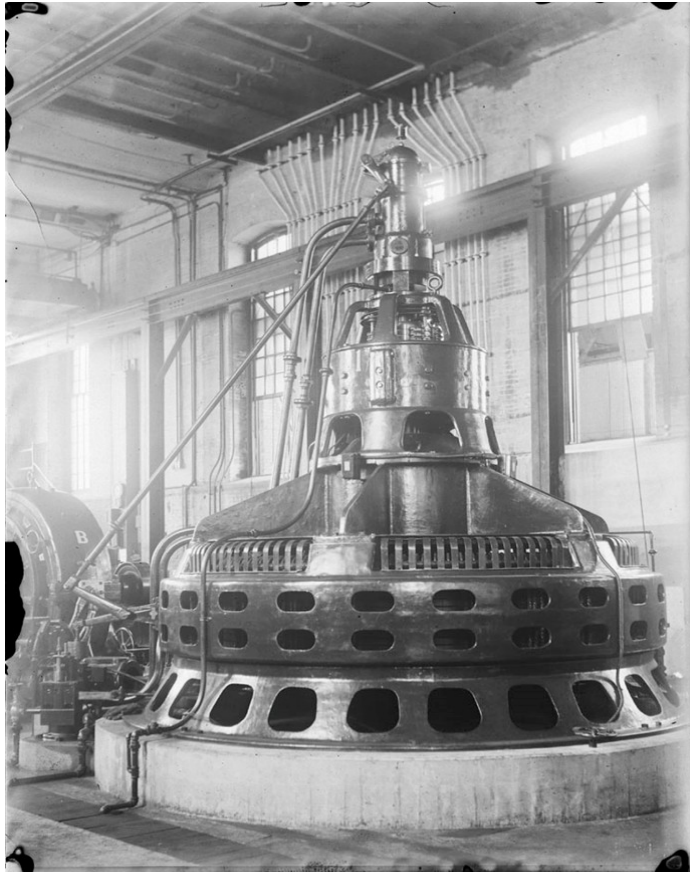
Generator Manuf: Stanley/GE, Westinghouse

HP Created: Kaplans 1,825 +/-, Francis 1,266 +/-

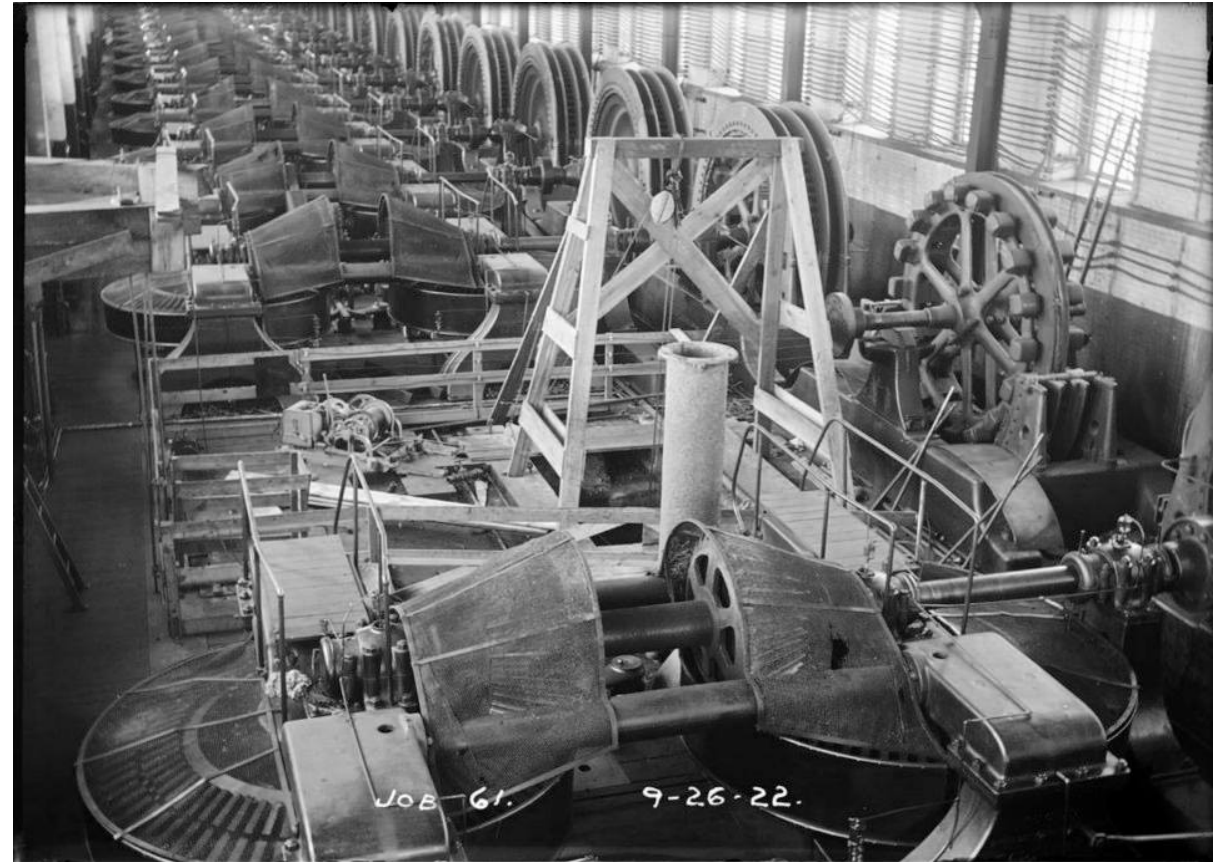
Power Generated: 19.6 MW (rated) 21.5 MW
(possible)



York Haven Power Co.



Variable blade Kaplans
(Units 1-4)



Dual Francis units (7-13 &
15-20)

York Haven Power Co.

Legacy Highlights

- Home of the 1st and 3rd Kaplan in the county (*engineering landmark ~ 1980*)
- Powerhouse nearly leveled in an ice flood in 1904
- Survived severe flooding in 1936 & 1972
- Initially handled distribution and issued electric bills locally
- Supported the York steam plant and trolley system



Closing Thoughts

oYork County has a long-running history of hydro power innovation.

oYork County continues to be a leading hydro power equipment manufacturing hub, with Voith and American Hydro continuing the Smith legacy.

oThe success of hydropower in York County is a collective effort, from those who manufacture and design to those operating the facilities.

Interested in learning or sharing more? Please consider joining our Facebook group or LinkedIn page. "Turbine Topics."



Cast 78" od S.M.S (cast)Francis turbine
York Haven 2018

Deer Creek Power & Light ~ Pylesville, MD.

Operating Name: Deer Creek Water & Water Power Co. (*Operating under Fawn Grove Light & Power*)

Incorporated:

Operational Span: 1918-1929

Service Area: Glenrock area, Nearby Pylesville dwellings

General Purpose: Mill converted to electric generation



Deer Creek Power & Light

Supplying Tributary: Deer Creek

Operating Head: 30'

Unit Count: 2

Turbine Mauf.: S. Morgan Smith 12-18'' francis

Generator Manuf: EM (*now WEGG*)

HP Created: 100 hp +/-

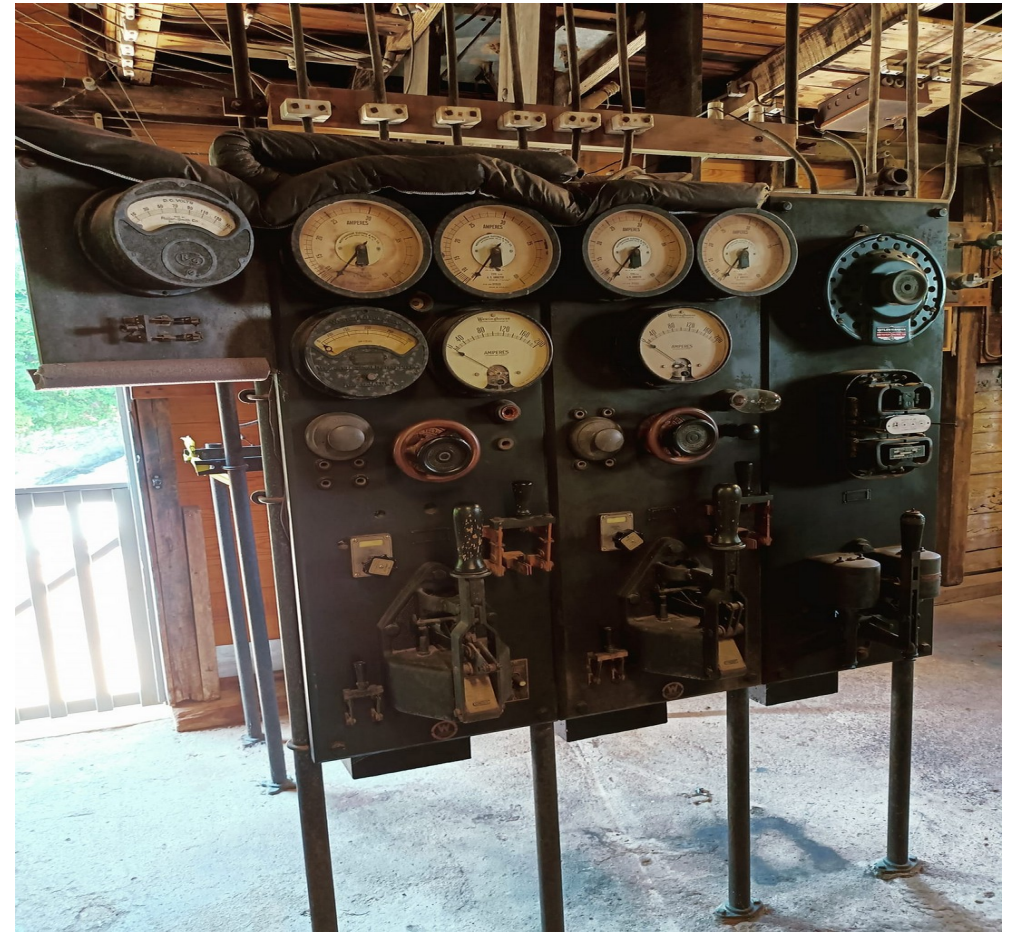
Power Generated: 100 kW



Deer Creek Power & Light

Closure:

- Unable to identify a specific date, but all documentation stops after 1934
- Demolished 1948
- Likely reasons for closure:
 - Holtwood Dam / Edison elec network
 - Economics



Thank You



Eden Mills~ Pylesv